

# Implementation of Rare Earth Primers and Pretreatments for Military Applications

Dr. Eric Morris Technical Manager

Deft, Inc.

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# Chrome-Free Primer Success

- F-35 JSF Program – Lockheed, Northrop, BAE
  - F-15's, F-22's, Apache's, E3's, T-45 (3 weeks)



Photo Courtesy of: <http://www.jsf.mil/gallery/>



# Total NC Systems Flying

- Spray Applied, Total Non-Cr Conversion Coating



USAF  
C-130



USAF F-15 Fleet



Royal Norwegian AF  
Sea King Trial

# RE System Performance Spirit's Data

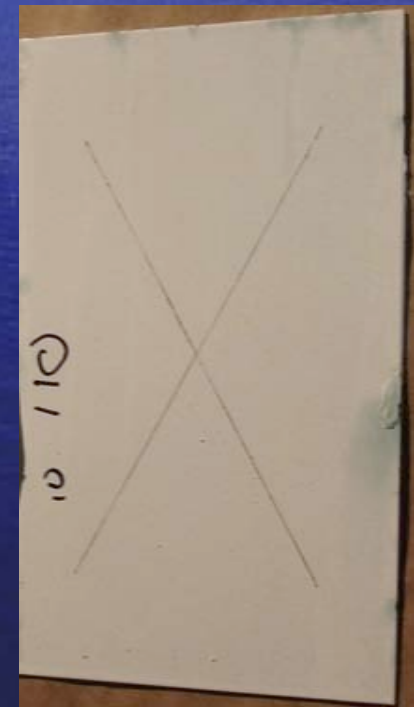
- Performance of RECC Systems



RECC/093  
2000 Hrs  
Deft



RECC/093  
1000+ Hrs  
Spirit



RECC/NCP  
2000 Hrs  
Spirit



# F-15 System Performance Battelle's Data

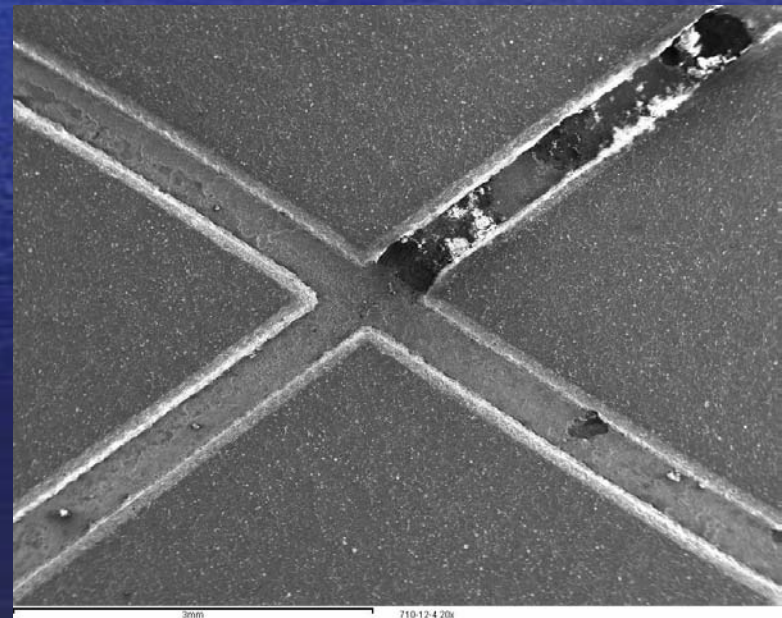
- System Testing
  - Comparison of N.S.S. to Beach Exposure

15 Months - Daytona



F-15 System

3000 N.S.S.

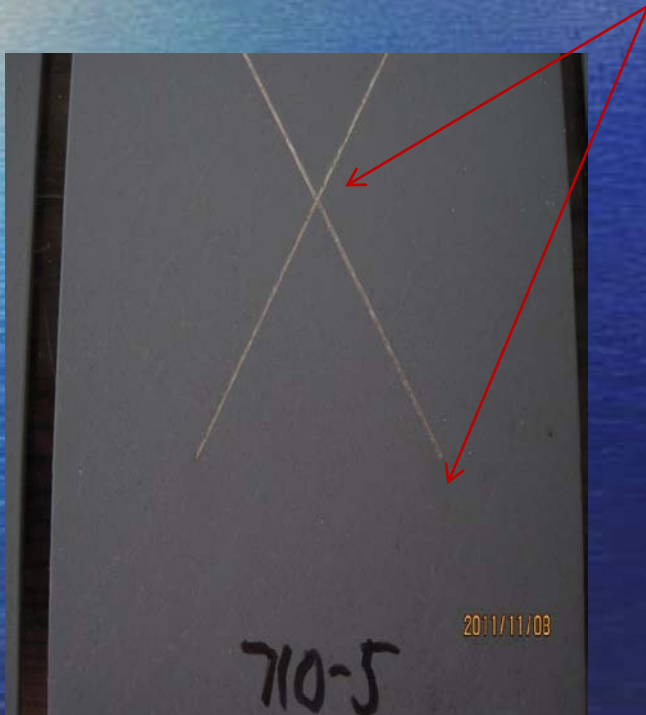


F-15 System

# F-15 System Performance Battelle's Data

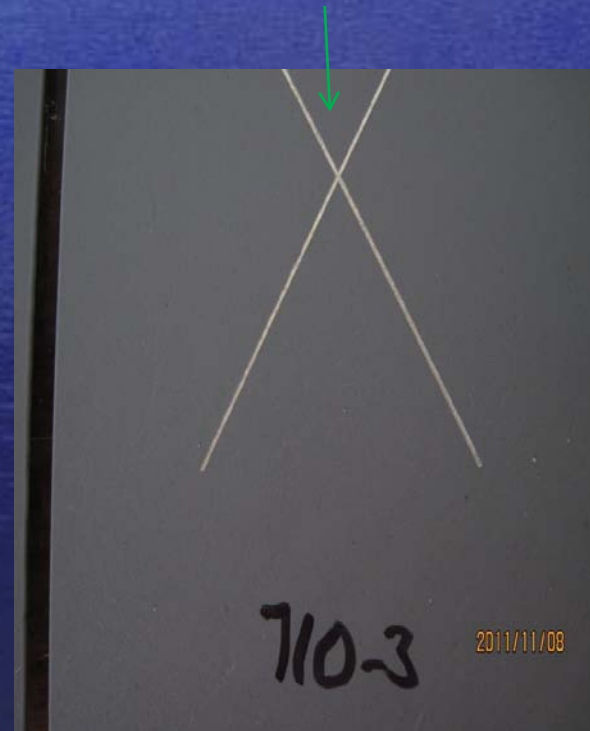
- Comparison of NCr to RE Primer/APC – 15 Months Daytona

Visible Oxidation



Non Cr<sup>6+</sup> System

No Visible Oxidation



F-15 System



# F-15 System Performance Lockheed's Data

- RECC 1015/3021/02GN093/99GY01



- ❖ No Report of Change by LM During Exposure



Close-Up

Exposed in 2008



# Non-Cr System For F-15's

- Over 100 F-15's Treated
  - T.O. 1F -15A-23



# Technical Information

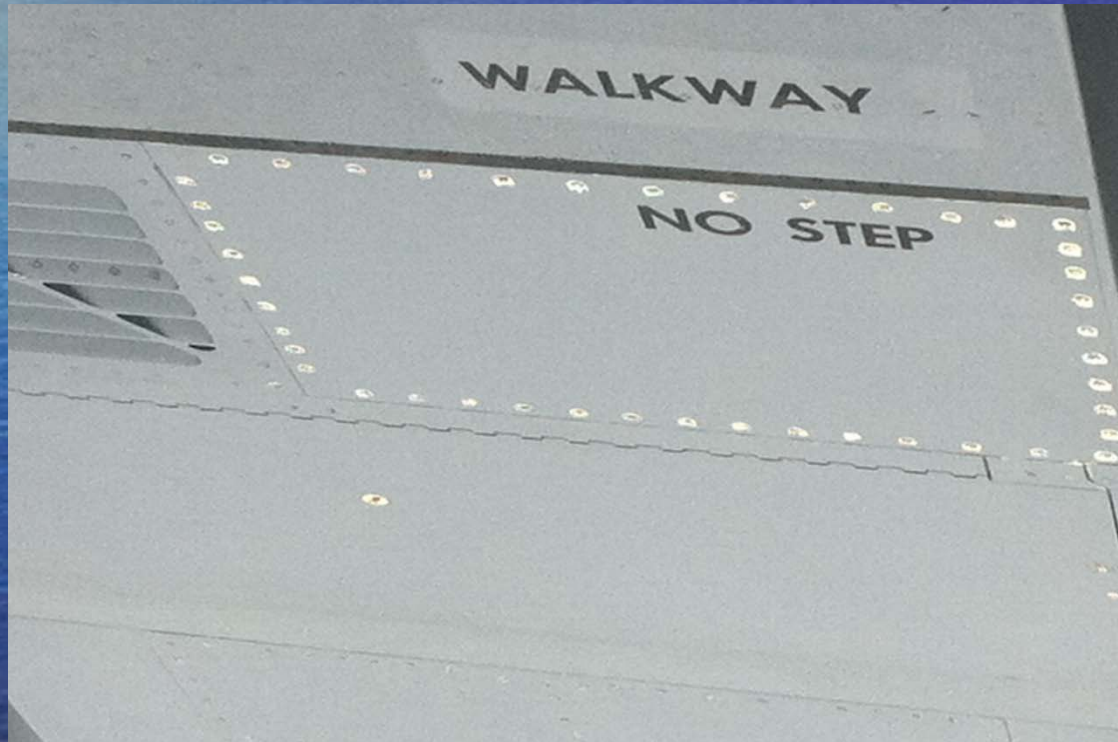


RECC deposits darker in areas of unpassivated / exposed metal  
(Areas of weakened passivation, rivets, abrasion, etc are conversion coated)  
(Areas of previous passivation are reinforced for adhesion/max corrosion protection)



# Benefits of Deft NC System

- Rivet Rash on Singapore F-15
  - Current Cr System



# Benefits of Rare Earth NC System

- No Erosion on Inlet/Rivet Rash Resolved
  - NOANG



No erosion observed

No Rivet Rash



# C-130 Applications

- Second of Three USAF C-130's



Photo Courtesy of Eric Morris



# Deft RECC Application

- C-130 Robins AFB

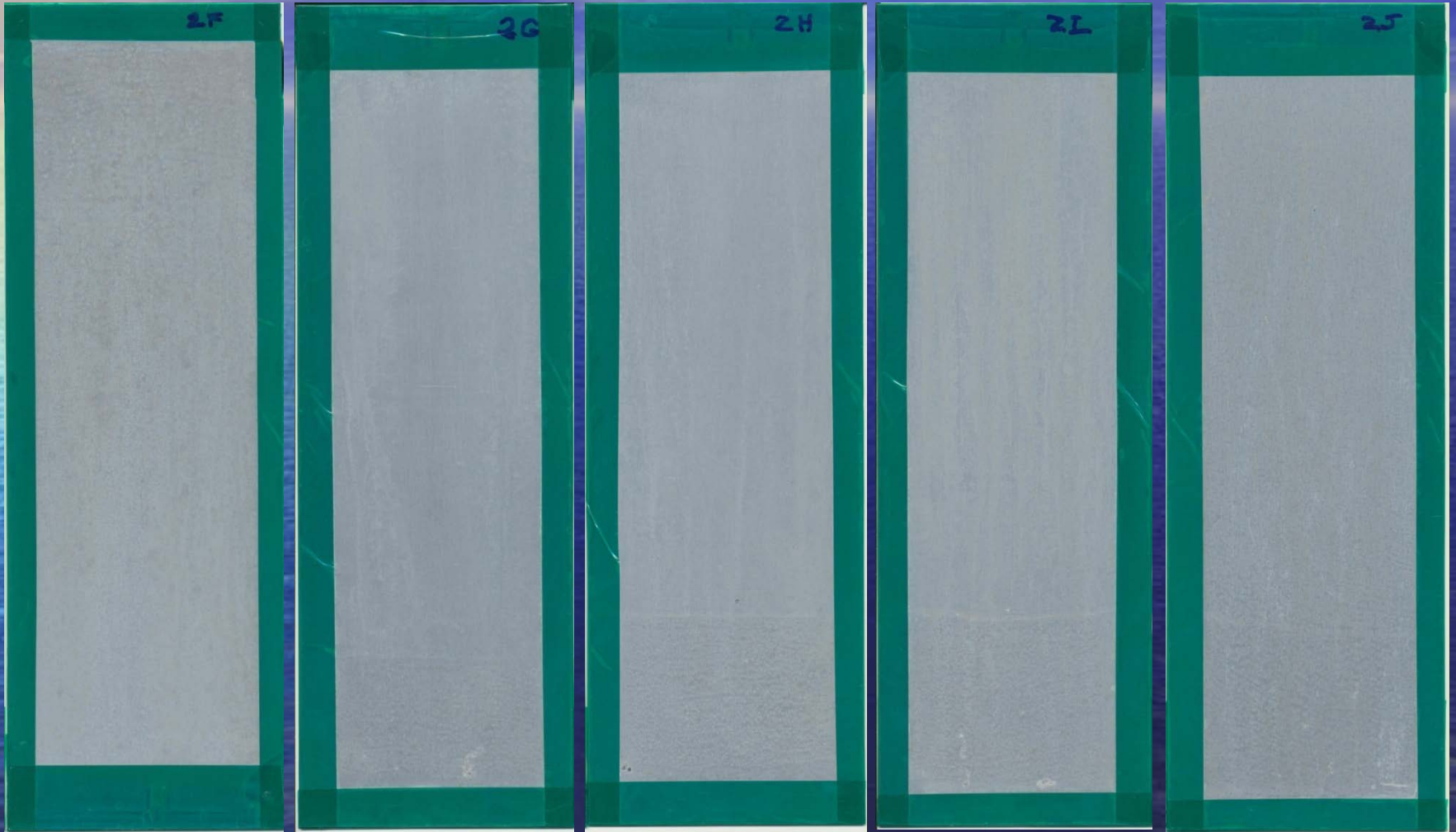




# Northrop Grumman Evaluation

Candidate 2 – 1001, 3030XD, 3050X

14 Days NSS



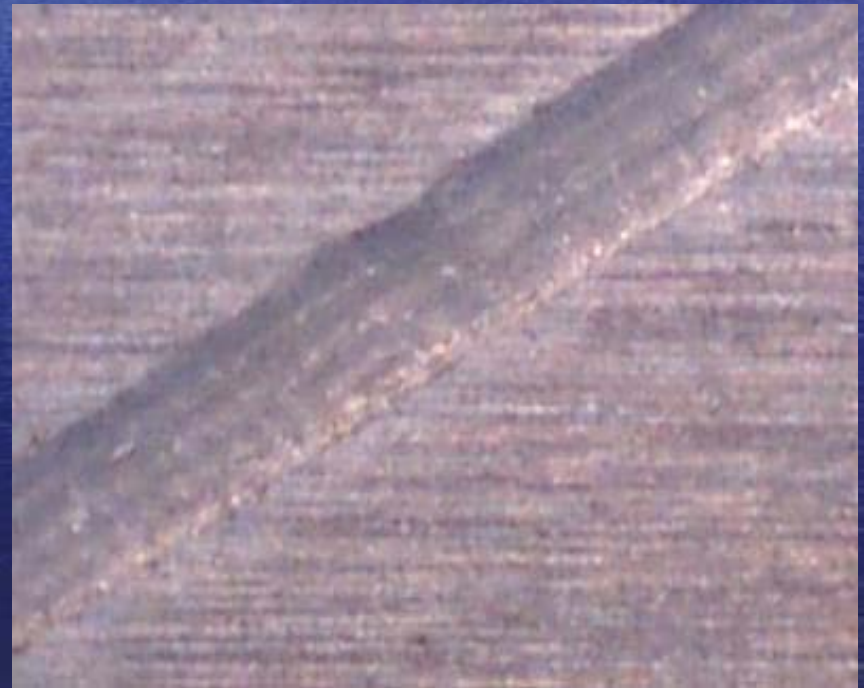
Bare Al 2024-T3

# Optical Microscope Characterization

- Self-Healing Characteristics – After 4 Days S.S.
  - CeCC Al 2024-T3 At 50 X Magnification



Barrier Coating/No Healing



Barrier and Self-Healing

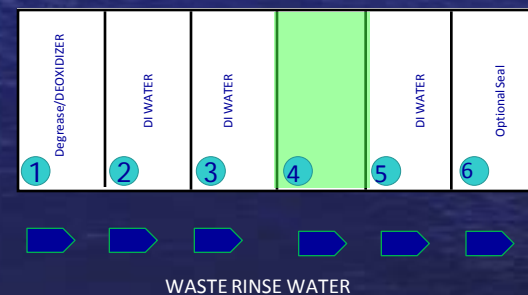


# Non-Chrome Conversion Coating Process

## Typical Immersion Conversion Coating Process



## Defi Immersion Conversion Coating Process



### BENEFITS

- Eliminate HEATED Aqueous Cleaning Tank, Support GhG initiative.
- Reduce the number of Tanks, reducing cycle time and waste rinse water.
- Eliminate the use of CHROMATED conversion coating. Reduce chrome WASTE.
- Safer Working Environment.

# Deft Clean 4000 Performance

- Deft Clean 4K brightens ferrous and non-ferrous parts





# Future Direction

- New NC System
  - Spray Applied Bare 2024 / 02-Type / Deft APC



# Performance-Bottom Line

- Active Duty Environment
  - 200-400 F
  - Mach 2+

